

REMARKS

The instant Office Action dated January 30, 2008 listed the following rejections: claims 1-3 and 5-10 stand rejected under 35 U.S.C. § 103(a) over Hueting *et al.* (U.S. Patent No. 6,515,348) in view of Dennen (U.S. Patent No. 6,555, 872); and claim 4 stands rejected under 35 U.S.C. § 103(a) over Hueting '348 in view of Dennen and further in view of Hueting *et al.* (U.S. Patent No. 6,534,823).

Applicant respectfully traverses the § 103(a) rejection of claims 1-3 and 5-10 because the cited combination does not correspond to the claimed invention which includes, for example, aspects directed to the source and drain implantations including conductive shallow contact regions. The Examiner acknowledges that the Hueting '348 reference fails to teach these aspects of the claimed invention. *See, e.g.*, the bottom of page 3 of the instant Office Action. In an attempt to address these deficiencies, the Examiner erroneously asserts that Dennen's source and drain regions (123 and 124) are shallow contact regions. *See, e.g.*, Figure 9. As is apparent from Dennen's use of the terms source and drain regions, the cited portions of Dennen do not teach that regions 123 and 124 are conductive shallow contact regions of source and drain implantations. Instead, Dennen teaches that regions 123 and 124 are source and drain regions. *See, e.g.*, Figure 9 and Col. 26:38-39. In response to Applicant's arguments presented in the Office Action Amendment and Response dated November 16, 2007 (hereby incorporated by reference in its entirety), the Examiner erroneously asserts that Dennen's undepleted portion 122a can comprise a deeper portion of the source and drain regions. Once again the cited portions of Dennen directly contradict the Examiner by stating that "the width and doping level of the undepleted portion 122a of the tub 122 under the drain region 124 can be "tuned" to serve as a vertical drift region". *See, e.g.*, Col. 23:22-26. Thus, Dennen's undepleted portion 122a is part of tub 122 and the undepleted portion 122a serves as a drift region. Dennen's undepleted portion 122a is not a deeper part of source and drain regions (123 and 124). Accordingly, the cited portions of the Dennen reference do not teach source and drain implantations that have conductive shallow contact regions, let alone that the conductive shallow contact regions extend to a depth of no more than 35% of the depth of the trench as in the claimed invention.

Regarding the Examiner's assertion that Applicant has not established the criticality of the ratio of the depth of the shallow contact regions to the depth of the trench, Applicant notes that the Examiner must first present a *prima facie* case of obviousness before Applicant need show the criticality of a claimed range. *See, e.g.*, M.P.E.P. § 2144.05 ("In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976)"). In this instance, the Examiner has not presented a *prima facie* case of obviousness because the Examiner has not cited to any reference that teaches source and drain implantations which have conductive shallow contact regions as discussed above. Accordingly, the § 103(a) rejection of claims 1-3 and 5-10 is improper and Applicant requests that it be withdrawn.

Applicant further traverses the § 103(a) rejection of claims 1-3 and 5-10 because the Examiner has provided no evidence of motivation to combine the Hueting '348 and Dennen references. This approach is contrary to the requirements of § 103 and relevant law. "A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (U.S. 2007). The Examiner asserts that one of skill in the art would combine the cited teachings of Hueting '348 and Dennen "for the benefit of maximizing the breakdown voltage of trench gate Fermi-FET transistors." *See* page 4 of the instant Office Action. However, the cited portions of Dennen teach that the source and drain regions (123 and 124) can be made shallow enough to allow a region of low concentration N silicon to exist above the junction between the tub 122 and well 123. *See, e.g.*, Figure 9 and Col. 26:38-41. As is shown in Figure 9 (reproduced below), the Hueting '348 reference does not have a structure that corresponds to Dennen's tub 122, thus, the Examiner has not shown that Hueting '348 would benefit from the teachings of Dennen as asserted (*i.e.*, that the proposed combination would maximize the breakdown voltage of Hueting '348).

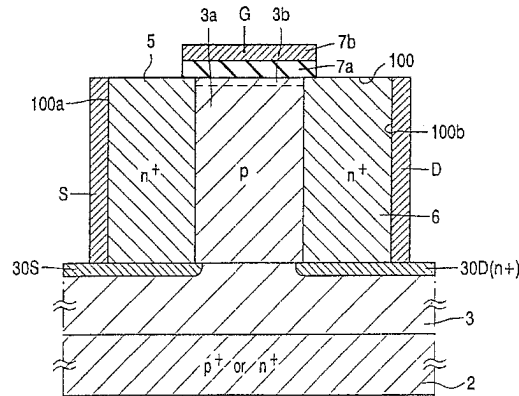


Figure 9 Hueting '348

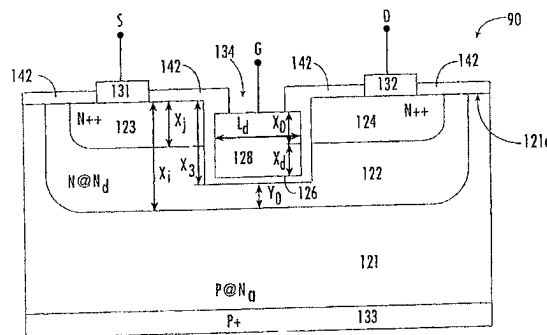


Figure 9 Dennen

The Examiner responded to Applicant's previous arguments by stating that "by this motivation alone, regardless of whether or not Hueting's device has a structure that corresponds to Dennen's tub, it can still benefit from a conductive shallow contact region in order to maximize the breakdown voltage." However, the Examiner still has not provided any evidence that the proposed combination would maximize the breakdown voltage of Hueting '348. Applicant submits that the statements made by the Examiner amount to no more than conclusory statements of generalized advantages and convenient assumptions about skilled artisans. Such statements and assumptions are inadequate to support a finding of motivation, which is a factual question that cannot be resolved on subjective belief and unknown authority. Thus, the Examiner relies upon improper conclusory statements in asserting obviousness, thereby directly contradicting M.P.E.P. § 2142 which states that "rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." See, also *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (U.S. 2007).

Moreover, as discussed above, the Dennen reference teaches source and drain regions (123 and 124); Dennen does not teach source and drain implantations that have conductive shallow contact regions as asserted by the Examiner. Applicant submits that Dennen increases the breakdown voltage by making the source and drain regions (123 and 124) shallow enough to allow a region of low concentration N silicon to exist above the junction between the tub 122 and well 123. *See, e.g.*, Figure 9 and Col. 26:38-41. Thus, the Dennen reference does not teach that providing source and drain regions with conductive shallow contact regions would increase the breakdown voltage as asserted by the Examiner. Accordingly, Applicant submits that the cited teaching of Dennen would not motivate one of skill in the art to combine conductive shallow contact regions with the Hueting '348 reference.

In view of the above, the Examiner has not provided any evidence as to why one of skill in the art would find the asserted combination obvious as required. Thus, the § 103(a) rejection of claims 1-3 and 5-10 is improper and Applicant requests that it be withdrawn.

Applicant respectfully traverses the § 103(a) rejection of claim 4 because the cited combination of the Hueting '348 and Dennen references does not correspond to the claimed invention as discussed above in relation to the § 103(a) rejection of claim 1. In at least this regard, the § 103(a) rejection of claim 4 is improper since claim 4 depends from claim 1. Accordingly, Applicant requests that the § 103(a) rejection of claim 4 be withdrawn.

Applicant requests clarification regarding the Examiner's statement that "in the instant case, Dennen's tub region 122 may be present in the structure of Hueting". *See* page 9:9-11 of the instant Office Action. Is the Examiner now proposing to combine Dennen's tub region 122 with Hueting '348? The Examiner has not proposed such a combination in the rejections presented in either the instant or previous Office Actions. If this is the case, it is unclear to Applicant how the Examiner is proposing to combine these teachings because the Examiner has not provided any detail regarding how Dennen's tub region 122 is to be combined with Hueting '348. For example, is Dennen's tub region 122 to replace some part of the structure of Hueting '348 shown in Figure 9 reproduced above? Applicant requests that the Examiner clarify which parts of Dennen


are being combined with Huetting '348 and how the Examiner is proposing to combine these parts with Huetting '348.

In view of the remarks above, Applicant believes that each of the rejections has been overcome and the application is in condition for allowance. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Peter Zawilski, of NXP Corporation at (408) 474-9063 (or the undersigned).

Please direct all correspondence to:

Corporate Patent Counsel
NXP Intellectual Property & Standards
1109 McKay Drive; Mail Stop SJ41
San Jose, CA 95131

CUSTOMER NO. 65913

By: 
Name: Robert J. Crawford
Reg. No.: 32,122
651-686-6633
(NXPS.323PA)